

WHAT IS CLAIMED IS:

1. A recombinant protein designated as PA-I of SEQ:ID NO:1, useful for inhibiting anthrax toxin.
2. A recombinant protein as claimed in claim 1, wherein the said protein is non toxic to host cells.
3. A recombinant protein as claimed in claim 1, wherein the said protein inhibits native protein Protective Antigen (PA) mediated cellular intoxication.
4. A recombinant protein as claimed in claim 1, wherein the said protein inhibits the channel forming ability of PA protein.
5. A recombinant protein as claimed in claim 1, wherein the said protein when applied with PA in the ratio of about 1:1, completely inhibits the anthrax lethal toxin.
6. A recombinant protein as claimed in claim 1, wherein the PA-I has oligopeptide of SEQ ID NO:2 instead of oligopeptide of SEQ ID NO:3 of native PA.
7. The gene encoding the recombinant protein PA-I, defined in claim 1, having sequence SEQ ID NO:4.
8. A pair of oligonucleotide primers of SEQ ID NO:5 and SEQ ID NO:6, wherein the primers are reverse primer and forward primer respectively.
9. A process for constructing a recombinant protein PA-I as defined in claim 1, said process comprising steps:
 - v) amplifying a region of PA gene encoding 2 β 2-2 β 3 loop using the primers of SEQ ID NO:5 and SEQ ID NO:6;
 - vi) mutating the amplified PA gene by replacing SEQ ID NO:3 of native PA with SEQ ID NO:2,
 - vii) cloning the amplified mutated PA gene of step (ii) into a vector, and
 - viii) expressing the clone in a host to obtain the recombinant protein PA-I.
10. A method as claimed in claim 9, wherein the host used is selected from a group comprising *E. coli* and *Bacillus anthracis*.
11. A method as claimed in claim 9, wherein the vector for cloning the mutant gene is selected from a group of expression vector comprising plasmid pYS5 and pMS1.
12. A process as claimed in claim 9, wherein the said protein is non toxic to cells.

13. A process as claimed in claim 9, wherein the said protein inhibits native PA mediated cellular intoxication.
14. A process as claimed in claim 9, wherein the said protein inhibits the channel forming ability of PA toxin.
15. A process as claimed in claim 9, wherein the said recombinant protein PA-I completely inhibits the anthrax lethal toxins.
16. A method as claimed in claim 9, wherein the concentration of PA-I used for testing anthrax toxin inhibition is in the range of 0.01 µg/ml to 0.1 µg/ml.
17. A composition useful in inhibiting anthrax toxin, said composition comprising a recombinant protein PA-I of SEQ ID NO:1 and pharmacologically acceptable additive(s).
18. A composition as claimed in claim 17, wherein the additives are selected from a group comprising glucose and PBS.
19. A method of treating anthrax infection in a subject in need thereof, said method comprising step of administering pharmacologically effective amount of PA-I optionally along with pharmacologically acceptable additive(s).
20. A method of treatment as claimed in claim 19, wherein the additives are selected from a group comprising glucose and PBS.
21. A method as claimed in claim 19, wherein the PA-I is administered intravenously.
22. A method of treatment as claimed in claim 19, wherein the subject is a mammals, preferably human.
23. A method as claimed in claim 19, wherein the recombinant protein PA-I completely inhibits the toxicity of anthrax lethal toxin.
24. A method as claimed in claim 23, wherein recombinant protein PA-I results in 100% survival of rats even after 72 hours of injecting toxin.
25. A method as claimed in claim 23, wherein recombinant protein PA-I inhibits pore formation by native PA in cells.